REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Claim Amendments

Claim 3 has been amended to incorporate the limitation of claim 4, to recite the variation width of the pH and to limit the reaction temperature to 92-98°C. Support for these limitations is found on page 10, lines 12-13 of Applicants' specification.

Claim 4 has been cancelled, without prejudice or disclaimer.

No new matter has been added to the application by these amendments.

Consideration After Final Rejection

Although this Amendment is presented after final rejection, the Examiner is respectfully requested to enter the amendments and consider the remarks, as they place the application in condition for allowance.

Patentability Arguments

The patentability of the present invention over the disclosures of the references relied upon by the Examiner in rejecting the claims will be apparent upon consideration of the following remarks.

Rejections Under 35 U.S.C. § 103(a)

Claims 1-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kono et al. (U.S. 6,417,264) in view of Hiroshi (JP 9142827).

Claims 9-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kono et al. in view of Hiroshi as applied to claims 1 above, and further in view of Ichinose et al. (U.S. 2003/0039808).

These rejections are respectfully traversed for the following reasons.

In item 2 of the Office Action, the Examiner says that Kono states, "... a resultant slurry being treated to be dispersed with a high-pressure homogenizer once (Kono, c. 5, l. 66-67; c. 6, l. 1-3) ...."

However, this passage quoted by the Examiner does not mention that a slurry obtained from a cake of precipitated silica is treated with a high-pressure homogenizer once. Rather, the quoted passage refers to both the case of obtaining a dispersion from powder of dry processed silica, and the case of obtaining a dispersion from precipitation processed silica cake. This passage of Kono generally discusses these two cases together, stating that the treating cycle with a high-pressure homogenizer may be determined, so that a silica dispersion as disclosed in Kono may be obtained, in a range of once to some ten times.

Contrary to the Examiner's assertion, the above-discussed passage does not disclose that a slurry obtained from a cake of precipitated silica is treated once, and achieves a light-scattering index (n-value) of at least 2. In fact, a precipitation processed silica cake (easily dispersible precipitated silica cake of the present invention) which gives a light-scattering index (n-value) of a silica dispersion of at least 2, when treated once with a high-pressure homogenizer is not disclosed by Kono.

The above-quoted passage refers to two general scenarios, from which one skilled in the art would look to the specific passages of the reference to gain more guidance. In the Examples of Kono, the treating cycle is one when powder of dry processed silica was used as a raw material, whereas the treating cycle is three when precipitation processed silica cake was used as a raw material. Thus, Kono actually teaches away from Applicants' invention.

Applicants kindly direct the Examiner to pages 35-36 of the specification, which states as follows:

"As so far explained, the silica cake of the present invention shows very excellent dispersibility in occasions of dispersing the same in polar solvent, regardless of its very small primary particle size. Using this silica cake, highly transparent silica dispersions can be readily obtained. According to the present invention, therefore, productivity of silica dispersions can be drastically improved."

In item 3 of the Office Action, the Examiner states that Kono discloses an easily dispersible precipitated silica cake, having a water content of 85% by weight. However, the cited passage of Kono (c. 8, 1. 31-59) does not teach or suggest the easily dispersible precipitated silica cake of the present invention. Rather, Kono shows a silica cake which gives a light-scattering index of at least 2 when treated three times with a high-pressure homogenizer (Kono, c. 8,1. 54-57; c. 9, TABLE 1, Example 5). One-cycle treatment does not attain a light-scattering index of at least 2.

In this regard, Applicants refer the Examiner to the Declaration filed November 6, 2008, in which Applicants clearly demonstrated that Example 5 of Kono results in a light scattering index of 1.6 when a one-cycle treatment is applied.

In response to these previously presented arguments, the Examiner states that "Claim 1 does not require the limitations following 'wherein when' in the 3rd line of the claim; rather, these limitations are merely circumstantial." However, Applicants respectfully assert that the Examiner's position is untenable.

Contrary to the Examiner's assertion, the limitations following "wherein when" at the 3rd line of claim 1 are necessary, and must be considered when determining patentability. Specifically, the easily dispersible cake of precipitated silica of Applicants' claim 1 has a BET specific surface area of at least 220 m^2/g, and is easily dispersible, i.e., gives easily (by a one-cycle treatment with a high-pressure homogenizer under a certain condition) a dispersion of silica with good dispersibility (a light-scattering index is at least 2).

The easily dispersible silica cake of precipitated silica of Applicants' claim 1 shows very excellent dispersibility when dispersing the same in a polar solvent, regardless of its very small primary particle size. Furthermore, using this silica cake, highly transparent silica dispersions may be readily obtained. Thus, the productivity of silica dispersions are drastically improved by Applicants' invention.

The easily dispersible silica cake of Applicants' claim 1 is not simply a precipitated silica cake which gives good dispersibility. Rather, the easily dispersible silica cake of Applicants' invention gives a silica dispersion with a good dispersibility by a one-cycle treatment with a high-pressure homogenizer under a certain condition. A precipitated silica cake which needs two

or more cycles of treatment with a high-pressure homogenizer under a certain condition to give a silica dispersion with a good dispersibility is different from the easily dispersible precipitated silica cake of Applicants' claim 1.

The limitations following "wherein when" at the 3rd line of claim 1 stipulate how to measure the required property of "easy dispersibility", i.e., to determine the light scattering index.

Also, in item 11 of the Office Action, following the discussion that the limitations following "wherein when" are merely circumstantial, the Examiner states that Hiroshi disclose a silica concentration of 5% by weight in the aqueous dispersion of silica. However, Applicants respectfully assert that whether or not Hiroshi discloses a silica concentration of 5 % by weight in silica dispersion has nothing to do with the invention of the easily dispersible precipitated silica cake of claim 1.

Thus, Kono fail to teach or suggest the easily dispersible cake of precipitated silica of Applicants' claim 1, wherein a resultant dispersion has a light-scattering index of at least 2. Additionally, Hiroshi fail to remedy the deficiencies of the Kono reference.

In item 4 of the Office Action, the Examiner states asserts that Kono disclose a process for producing an easily dispersible cake of silica. Although the Examiner interprets the reference as teaching that water is used as an initial reaction liquid, Kono actually shows using an aqueous alkali silicate solution as an initial reaction liquid (Kono, c. 7, 1. 4-5), adding sulfuric acid to the aqueous alkali silicate solution (Kono, c. 7, 1. 6-11), keeping the temperature at 40° C up to the middle of reaction (or to a neutralization rate of 50%), and later keeping the temperature at 95°C (Kono, c. 7, 1. 6-9).

Applicants' process keeps the pH of the reaction liquid at a constant (fixed) value within a range of 7.5-11.5 (variation width being ± 0.3), and adds alkali silicate and mineral acid simultaneously to the reaction liquid while keeping temperature in a range of 92-98°C. During the reaction (when alkali silicate and mineral acid are being simultaneously added to the reaction liquid), said temperature is maintained. These limitations are required by claim 3, which recites:

> "simultaneously adding an alkali silicate and a mineral acid to a reaction liquid of which pH is being maintained at a fixed value within a range of 7.5 - 11.5, and of which temperature is being maintained at 92-98°C".

Kono fails to disclose adding alkali silicate and mineral acid simultaneously to the reaction liquid. Kono also fails to disclose adding alkali silicate and mineral acid simultaneously to the reaction liquid while keeping the temperature in a range of 92-98°C. Although Kono adds mineral acid to aqueous alkali silicate solution for reaction, the temperature is maintained at 45°C in the first half of reaction (up to a neutralization rate of 50%) and at 95°C in the last half of reaction (from a neutralization rate of 50% up to 100 %). Thus, the temperature is clearly not kept at 95°C throughout the reaction.

The Examiner asserts that adding alkali silicate and mineral acid simultaneously to the reaction liquid is a matter of process design and optimization, and would have been obvious to anyone skilled in the art. However, the Examiner has provided no basis for this assertion. Further, for those who have no objective of producing easily dispersible precipitated silica cake, adding alkali silicate and mineral acid simultaneously to the reaction liquid would not be a matter of process design and optimization, and would thus be unobvious.

Also, in item 13 of the Office Action, the Examiner indicates that Hiroshi teach simultaneous addition of alkali silicate and mineral acid to the reaction liquid. However, contrary to the Examiner's assertion, Hiroshi only discloses that sulfuric acid and sodium silicate were added to a reaction vessel at a constant ratio, and does not mention that sulfuric acid and sodium silicate were simultaneously added. Further, Hiroshi fails to disclose the production of the claimed (claim 1) easily dispersible cake of precipitated silica, and fails to disclose keeping the reaction temperature in a range of 92-98°C.

The Examiner also asserts that Kono discloses the pH of the reaction liquid being maintained at a neutral pH. However, the Examiner does not refer to any particular portion of the disclosure, and thus, it is unclear upon what teaching this assertion is based. In Kono, aqueous alkali silicate solution was neutralized to a neutralization rate of 50% with sulfuric acid, and, then, sulfuric acid was further added until the neutralization rate came up to 100% (Kono, c. 7, l. 6-11). According to this disclosure, the aqueous alkali silicate solution was neutralized to 50%, and then to 100%. Thus, the value of pH gradually lowers from the alkali side, and thus, it cannot be said that pH was maintained at a fixed value. The mere fact that a pH range overlaps with the recited pH range of 7.5-11.5 does not meet the recited claim limitation.

In item 5 of the Office Action, the Examiner states that Kono discloses a concentration of silica solid in the reaction mixture at the ending time of the reaction of 15 wt%. Initially, as mentioned above, the limitations of claim 4 have been incorporated into claim 3, as a result of which claim 4 has been cancelled.

Further, the value of 15 wt % (Kono, c. 7, 1. 13), which has been referred to by the Examiner, is a content of silica in a dewatered cake which was obtained by separation from reaction liquid after the reaction was over. This is distinct from the concentration of silica solid in the reaction mixture at the end time of the reaction, as recited in amended claim 3. Thus, Kono fails to show the concentration of silica solid in the reaction mixture at the ending time of the reaction.

Also, in item 14 of the Office Action, the Examiner states that the claimed numerical silica concentration limitation is considered to be a result effective variable. However, keeping the concentration of the silica solid in the reaction mixture at the ending time of the reaction not higher than 50 g/L is effective in allowing the obtained precipitated silica to have a BET specific surface area of at least 220 m^2/g (see the specification, page 13, lines 10-13). Although the Examiner asserts that this limitation is "a result effective variable", the Examiner provides no evidence regarding why one would alter this variable, particularly in order to achieve the effects discovered by Applicants.

For the reasons set forth above, it is evident that the subject matter of Applicants' claim 1, as well as claim 3, is patentable over Kono in view of Hiroshi.

Ichinose is relied upon as disclosing a coating liquid for ink-jet recording sheets and a process of making the same. Thus, Ichinose fail to remedy the deficiencies of Kono and Hiroshi.

Accordingly, the subject matter of Applicants' claims 1 and 3, as well as the claims dependent thereon, is clearly patentable over the cited combinations of references. Thus, it is respectfully requested that the above-rejections be withdrawn.

Conclusion

Therefore, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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